

CHAPTER 10

Family Amphisbaenidae

G. John Measey

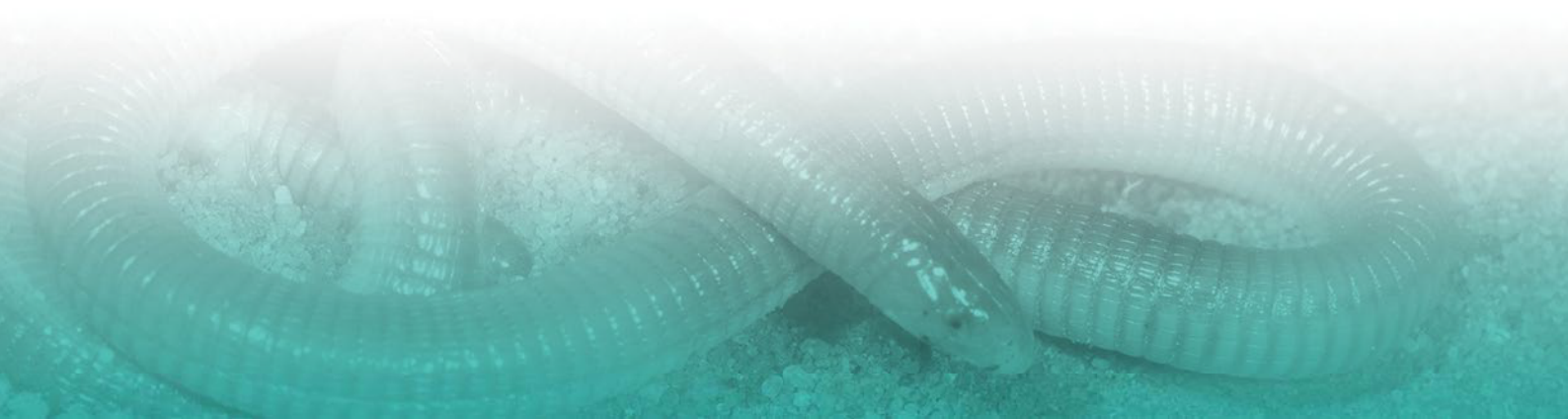
There are six families of amphisbaenians (Vidal *et al.* 2008b), a group of reptiles that have been traditionally treated separately from lizards and snakes, even though their relationships were controversial and poorly resolved. Recent molecular phylogenies have placed the Amphisbaenia unambiguously within the lizards (Sauria: Lacertilia) as the sister group of the Lacertidae (e.g. Townsend *et al.* 2004). Amphisbaenians are therefore considered to be a specialised group of limbless lizards. There are 183 species (Uetz 2012), distributed principally in sub-Saharan Africa (77 species) and South America (95 species), with small groups of species in the Caribbean, North America and Europe. The alpha-level taxonomy of the family has relied upon morphological characters (Gans 2005) but there appears to be much intraspecific morphological variation (e.g. Broadley *et al.* 1976) and results from molecular work have shown that the taxonomy used to diagnose genera of South American amphisbaenians was not appropriate (Mott & Vieites 2009). Of the seven genera previously recognised in South America, no less than five have been synonymised with *Amphisbaena* (Mott & Vieites 2009). The entire family would benefit from molecular phylogenetic investigation, and this is certainly true of species within the *Atlas* region (see Measey & Tolley 2013). African amphisbaenids include seven genera, with *Baikia* (one species) and *Cynisca* (18 species) restricted mainly to West and central Africa, and *Loveridgea* (two species) restricted to Tanzania. There are ten species in four genera within the *Atlas* region, distributed mainly in the north: Northern Cape, Free State, North-West Province, Gauteng, Limpopo, Mpumalanga, and northern KwaZulu-Natal. Most species tend to inhabit loose soils, although some are capable of using their specialised heads to burrow into very hard substrates.

Amphisbaenians bear a superficial resemblance to earthworms, with rings of scales encircling the body. Closer examination reveals a prominent scaly head with toothed mouth and nostrils, and an eye-spot can often be distinguished. These animals display a variety of adaptations for burrowing. Convergent evolution has resulted in four head shapes adapted for burrowing and feeding on soil macro-invertebrates (Kearney & Stuart 2004). The *Atlas*

region contains both round- and shovel-headed species, while keel-headed species exist elsewhere in Africa (Kearney 2003). Most species are oviparous but others give birth to young (e.g. Webb *et al.* 2000a). All species prey on soil macrofauna, mostly termites, but a wide range of other soil invertebrates are eaten by various species; prey is usually swallowed whole (Webb *et al.* 2000a).

The amphisbaenians have not previously been considered in conservation terms because they are infrequently encountered, many species are known only from type series and their ecology is poorly known. As a result, a large proportion are considered to be Data Deficient (Böhm *et al.* 2013). Broadley *et al.* (1976: 474) remarked that: “collecting amphisbaenians by hand is usually a back-breaking business with little reward”. This appears to be due to their subterranean habits rather than because they are uncommon, since densities are very high at times (Pooley *et al.* 1973; Broadley *et al.* 1976; Measey *et al.* 2009). There is anecdotal evidence that land-use change may impact negatively on their populations. For example, approximately 50 animals were found per hectare in one area when virgin land was first ploughed, but after a few years of ploughing, no amphisbaenians were found (Broadley *et al.* 1976). Measey *et al.* (2009) found that even within a protected area, densities declined over a period of 35 years, perhaps due to increased stocking of ungulates and the negative effect of this on leaf litter. Little is known about the current distribution, ecology and taxonomy of amphisbaenians in the *Atlas* region, and this prohibits a comprehensive conservation assessment. The contents of this chapter therefore represent a ‘best guess’ for most species.

The only amphisbaenian considered threatened in the *Atlas* region is *Chirindia langi occidentalis*, classified as Vulnerable. Major threats to this taxon are agriculture, afforestation and changes in game stocking levels. In the *Atlas* region *Monopeltis leonhardi* is known from only two QDGCs and it was therefore not assessed. There is a need to increase our knowledge of this family in general and this should include both taxonomic and biological studies.



Genus *Chirindia* Boulenger, 1907—pink round-headed worm lizards

This genus contains 5–9 species (Gans 2005; Uetz 2012) that occur in eastern and southeastern Africa. Two subspecies are known within the *Atlas* region: *Chirindia langi langi* and *C. l. occidentalis* occur on either side of the Soutpansberg in Limpopo Province. Both species have restricted

ranges and are deserving of further taxonomic work. Like other amphisbaenians, little is known of their ecology or the threats that they face. *Chirindia l. occidentalis* is now classified as Vulnerable and is threatened by agriculture, afforestation and changes in game stocking levels.

Chirindia langi langi FitzSimons, 1939

**LANG'S WORM LIZARD;
LANG'S ROUND-HEADED WORM LIZARD**

G. John Measey

Global: Least Concern

Near-endemic

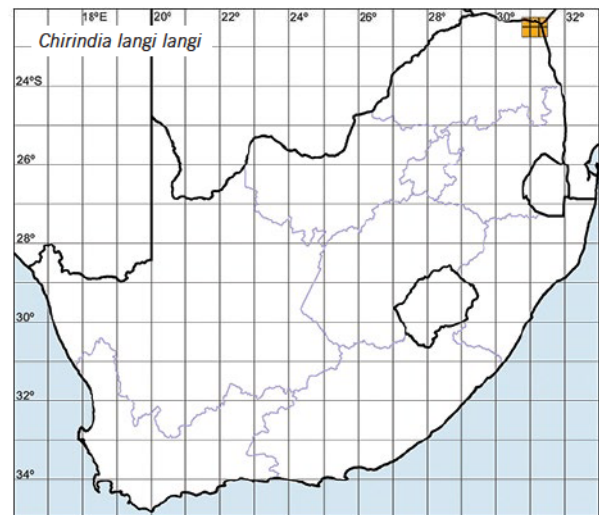
Taxonomy: The taxonomic status of *Chirindia langi occidentalis* should be re-assessed, preferably using a combination of morphological and molecular techniques.

Distribution: Endemic to the northeastern corner of Limpopo, South Africa and a small portion of adjoining Mozambique (Jacobsen 1989; Branch 1998). May also occur in southeastern Zimbabwe.

Habitat: Mostly fossorial, found under rocks on the soil surface, in burrows or in rotting logs, in sandy Kalahari soils and clayey Mopane woodland on both north- and south-facing slopes, at altitudes of 230–1 400 m (Jacobsen 1989).

Bioregion: Alluvial Vegetation; Lowveld; Mopane.

Assessment rationale: Very little is known about the distribution of this taxon, e.g. how far it extends into Mozambique. Threats in Mozambique are unknown. In South Africa, AOO and habitat quality are probably influenced by human land-use changes, although some small-scale changes such as subsistence agriculture may favour the taxon. Its range in the *Atlas* region is largely protected



within the Kruger National Park, and its global range is mainly within the boundaries of the Great Limpopo Transfrontier Park.

Conservation measures: Perform taxonomic studies. Conduct distribution surveys, especially in Mozambique. Investigate the effects of land-use change, especially in Mozambique.



Chirindia langi langi—Saseladonga, Kruger NP, LIMP (TM 28869) W.R. Schmidt



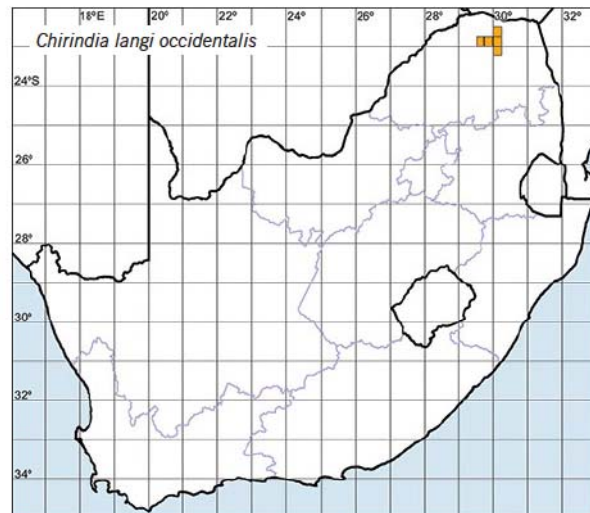
Chirindia langi langi—Mabyeni Hill, Kruger NP, LIMP (TM 59089) W.R. Schmidt

Chirindia langi occidentalis

Jacobsen, 1984

SOUTPANSBERG WORM LIZARD;
WESTERN ROUND-HEADED WORM LIZARD

G. John Measey

Global: **Vulnerable** B1ab(iii)**Endemic****Taxonomy:** The taxonomic status of this taxon should be re-assessed, preferably using a combination of morphological and molecular techniques.**Distribution:** Endemic to the low-lying areas of the Soutpansberg in northern Limpopo, South Africa (Jacobsen 1989).EOO: 6 030 km² (confidence: low); AOO: 2 670 km² (confidence: low).**Habitat:** Found singly under stones partially imbedded in sandy soils—mostly on the surface or in burrows with the stone as a roof—and occasionally under rotting logs, in mixed bushveld at elevations of 800–1 300 m (Jacobsen 1989).**Bioregion:** Mopane, Central Bushveld.**Assessment rationale:** EOO <20 000 km² [B1]; there are 6–10 locations [B1a], and there is a continuing decline in area, extent and quality of habitat [B1b(iii)] due to afforestation, use of land for crops, and changes in game stocking levels.**Threats:** Threatened by afforestation, agriculture and changes in game stocking levels (see Measey *et al.* 2009).**Conservation measures:** Conduct surveys to collect data that will allow for more accurate estimates of EOO and AOO. Carry out taxonomic studies and investigate land use changes.*Chirindia langi occidentalis*—Soutpansberg, LIMP

G.J. Alexander

Genus *Dalophia* Gray, 1865—blunt-tailed worm lizards

Dalophia is distributed in central and southern Africa. Members of this small genus of six (Uetz 2012) to 10 (Gans 2005) species are superficially similar to *Monopeltis* in that they are thick-bodied and have shovel-shaped heads. However, the tail is unusual because it is truncated and has a flattened terminal pad. These rarely-encountered lizards live within

the soil, prey on macro-invertebrates, and lay eggs (Branch 1998). A single species, *D. pistillum*, occurs within the *Atlas* region (Limpopo, North-West Province and Northern Cape). Although there are no known threats to this species, it may be susceptible to soil compaction and the other land-use changes that affect amphisbaenians (see family account).

Dalophia pistillum (Boettger, 1895)

**PESTLE-TAILED WORM LIZARD;
BLUNT-TAILED WORM LIZARD**

G. John Measey

Regional: Least Concern

Taxonomy: No notable issues.

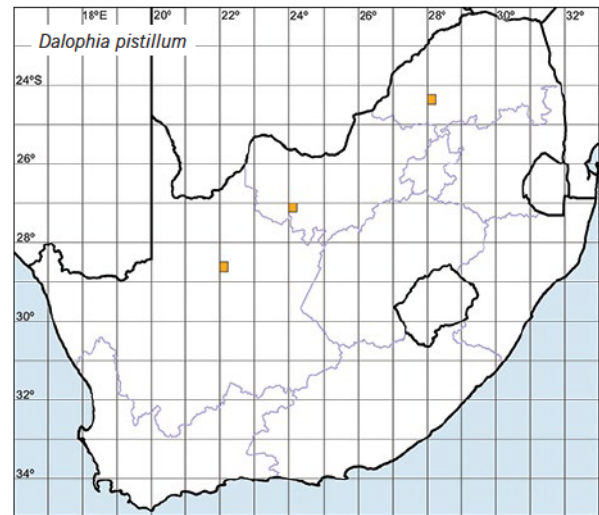
Distribution: Distributed widely in southern Africa, occurring in Botswana, eastern Namibia, southern Zambia and northern Zimbabwe, and extending as far east as mid-Mozambique (Branch 1998). In the *Atlas* region it is known only from the Nylstroom-Vaalwater area of Limpopo, the Vryburg area of North-West Province, and east of Upington in the Northern Cape (Bates *et al.* 2010).

Habitat: Fossorial, usually found within 20 cm of the soil surface; known to take refuge in grass roots at depths of 10 cm (Jacobsen 1989).

Bioregion: Central Bushveld; Eastern Kalahari Bushveld; Kalahari Duneveld.

Assessment rationale: Widespread and common outside the *Atlas* region. Although known from only three localities within the *Atlas* region (Bates *et al.* 2010), it is not considered to be under any specific threat here.

Conservation measures: None recommended.



Dalophia pistillum—Little Vumbura camp, Okavango Delta, Botswana
T. Reurmerman

Genus *Monopeltis* A. Smith, 1848—African shovel-snouted worm lizards

The genus *Monopeltis* consists of 21 species (Gans 2005; Uetz 2012) found in sub-Saharan Africa. Six species occur within the *Atlas* region but there are taxonomic uncertainties surrounding some of these (e.g. *M. infuscata*). All species are fossorial, with a characteristic shovel-shaped head, which is used to lift soil when burrowing (Gans 1974).

These lizards spend all their time underground where they feed on macro-invertebrate prey. Females give birth rather than laying eggs (Webb *et al.* 2000a). They are occasionally encountered when stones are turned or soil is tilled. Threats are poorly understood but might include mechanised agriculture and soil compaction (Broadley *et al.* 1976).

Monopeltis capensis A. Smith, 1848

CAPE WORM LIZARD;
CAPE SPADE-SNOURED WORM LIZARD

G. John Measey

Global: Least Concern

Near-endemic

Taxonomy: Broadley *et al.* (1976) identified three allopatric forms of *Monopeltis c. capensis* that differed mainly in annulation, size and degree of pigmentation. Typical *M. capensis* is referable to Group A. Group B was later described as *M. infuscata*, while Group C is referable to *M. decosteri* (Broadley *et al.* 1976; Broadley 1997). Broadley (1997) also elevated *M. c. rhodesianus* to full species status, rendering *M. capensis* monotypic. A molecular and phylogenetic analysis of *Monopeltis* is required.

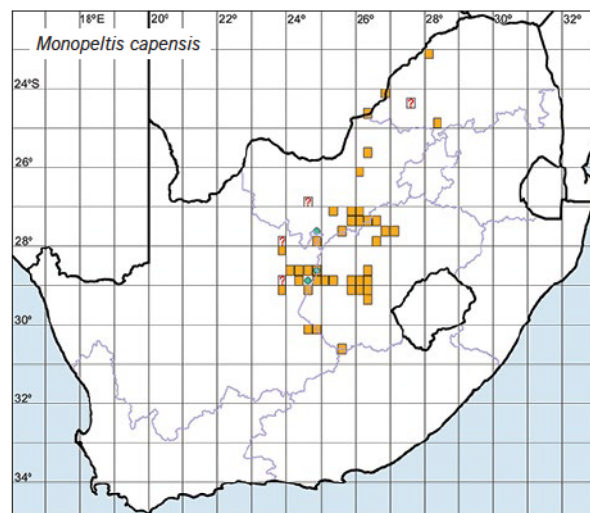
Distribution: Endemic to extreme southern Botswana and the central regions of South Africa (Broadley 1997). Within the *Atlas* region this species occurs in the western half of the Free State and adjacent areas in the Northern Cape, North-West Province and the western half of Limpopo. It has also been recorded from the southern bank of the Orange River in the Eastern Cape (Broadley 1997). Distribution appears to coincide largely with Highveld Grassland and Kalahari Bushveld, but the species also occurs along the Vaal River, and along the Limpopo River on the border with Botswana. A few records on the map are considered questionable because of possible confusion with *M. infuscata*.

Habitat: Fossorial, especially in red soils, and found as deep as 20 cm in the Odendaalsrus area of the northwestern Free State (Broadley *et al.* 1976). In the Free State it has also been found in damp soil and in sand on the banks of rivers, and one specimen was found when a Suricate (*Suricata suricatta*) colony was excavated (De Waal 1978). A specimen from the Northern Cape was found under a large stone (Conradie *et al.* 2011).

Biome: Grassland; Savanna.

Assessment rationale: Widespread and common.

Conservation measures: None recommended.



Monopeltis capensis—Rooiport NR, NC

W. Conradie

Monopeltis decosteri* Boulenger, 1910*DE COSTER'S WORM LIZARD;
DE COSTER'S SPADE-SNOURED WORM LIZARD**

G. John Measey

Regional: Least Concern

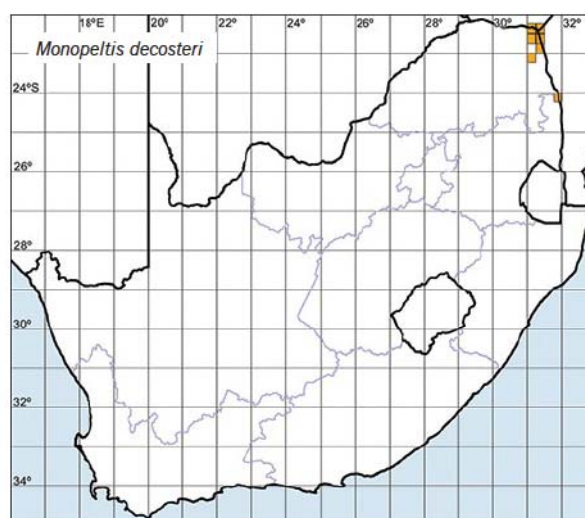
Taxonomy: Broadley *et al.* (1976) considered *Monopeltis decosteri* to be a synonym of *M. capensis*, referable to Group C. However, a subsequent revision by Broadley (1997) revived *M. decosteri* as a full species. The entire *M. capensis* group requires a taxonomic investigation using molecular methods because morphological traits appear to be very variable.

Distribution: Endemic to southeastern Africa. Found in southern Mozambique, southeastern Zimbabwe and along the eastern border of the Kruger National Park in Limpopo and Mpumalanga provinces, South Africa (Broadley 1997).

Habitat: Fossorial. Occurs in sandy soils in moist savanna (Branch 1998). Habitat and behaviour are probably similar to *M. capensis*.

Bioregion: Mopane; Lowveld.

Assessment rationale: Within the *Atlas* region it occurs mainly within the protected Kruger National Park. EOO



(8 000 km²) is below the Vulnerable threshold but there are no known specific threats and no known barriers to immigration from surrounding regions.

Conservation measures: Collect more comprehensive distribution data from inside and outside the *Atlas* region.



Monopeltis decosteri—Maputo Bay, Mozambique (holotype, SAM 650)
M. Burger



Monopeltis decosteri—Maputo Bay, Mozambique (holotype, SAM 650)
M. Burger

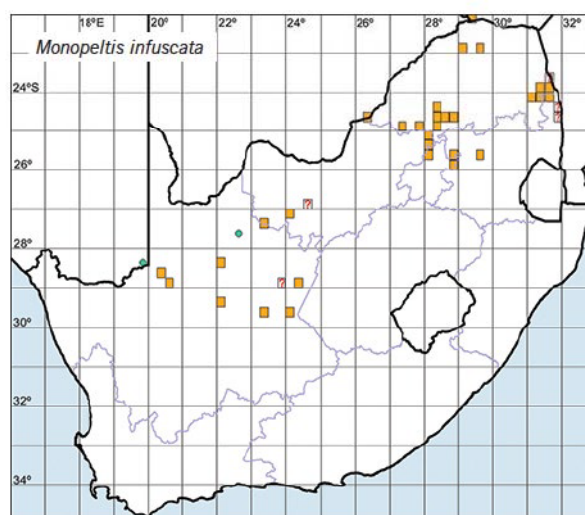
Monopeltis infuscata* Broadley, 1997*DUSKY WORM LIZARD;
DUSKY SPADE-SNOURED WORM LIZARD**

G. John Measey

Regional: Least Concern

Taxonomy: Broadley (1997a) elevated *Monopeltis capensis capensis* Group B to species status as *M. infuscata*. The taxonomy of the entire group will be improved by a systematic revision using molecular methods.

Distribution: Endemic to southern Africa. Most of the range lies north of the *Atlas* region in southwestern Angola, Namibia and southern Botswana (Broadley 1997). In the *Atlas* region it is found in Limpopo, Gauteng, western Mpumalanga, North-West Province and Northern Cape (Broadley 1997). A few records on the map are con-



sidered questionable because of possible confusion with other species of *Monopeltis*.

Habitat: Fossorial. Habitat probably similar to that of *M. capensis*.

Biome: Savanna; Nama-Karoo; Grassland.

Assessment rationale: Widespread inside and outside the *Atlas* region.

Conservation measures: None recommended.



Monopeltis infuscata—Umbabat Private NR, LIMP

D. Pietersen

Monopeltis leonhardi Werner, 1910

**KALAHARI WORM LIZARD;
KALAHARI SPADE-SNOUDED WORM LIZARD**

G. John Measey

Not Applicable

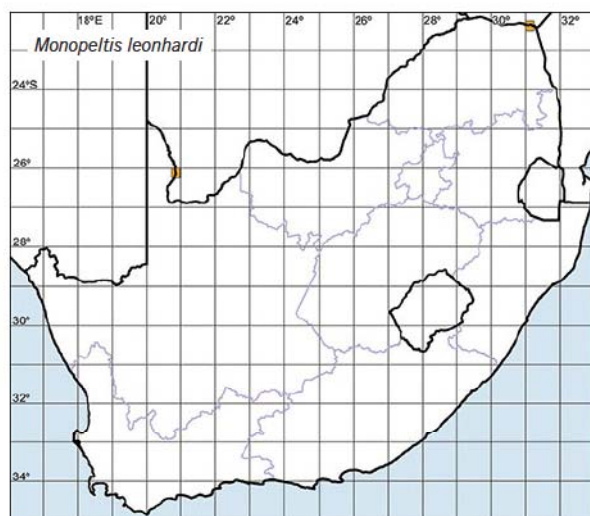
Taxonomy: No notable issues.

Distribution: Endemic to southern Africa. Distributed in the Kalahari of Namibia and Botswana, western and southern Zimbabwe, and along the Limpopo River into extreme northeastern South Africa (Branch 1998). In the *Atlas* region it is known from two marginal records, one in the Kgalagadi Transfrontier Park (Northern Cape) and one in Kruger National Park (Limpopo).

Habitat: Recorded from Kalahari sands. Found in shallow soil under logs and in gerbil burrows (Broadley *et al.* 1976).

Bioregion: Mopane; Kalahari Duneveld.

Assessment rationale: Widespread outside South Africa. The range within the *Atlas* region (where it is known from only two QDGCs) is less than 5% of the global range and the species was therefore not assessed.



Conservation measures: Carry out surveys to determine the distribution of this species within the *Atlas* region. Such information will be helpful for future assessments.



Monopeltis leonhardi—Farm Labota, Gobabis distr., Namibia (TM 33229)

W.R. Schmidt



Monopeltis leonhardi—Farm Labota, Gobabis distr., Namibia (TM 33229)

W.R. Schmidt

Monopeltis mauricei* Parker, 1935*MAURICE'S WORM LIZARD;
MAURICE'S SPADE-SNOURED WORM LIZARD**

G. John Measey

Regional: Least Concern

Taxonomy: *Monopeltis mauricei* was described from near Ghanzi, Botswana by Parker (1935) but later treated as a subspecies of *M. sphenorhynchus* by Broadley *et al.* (1976). Subsequently, when he recorded the first specimen of the typical form from Botswana, Broadley (2001a) elevated *M. s. mauricei* to specific status. This arrangement was followed by Gans (2005), but genetic support is needed.

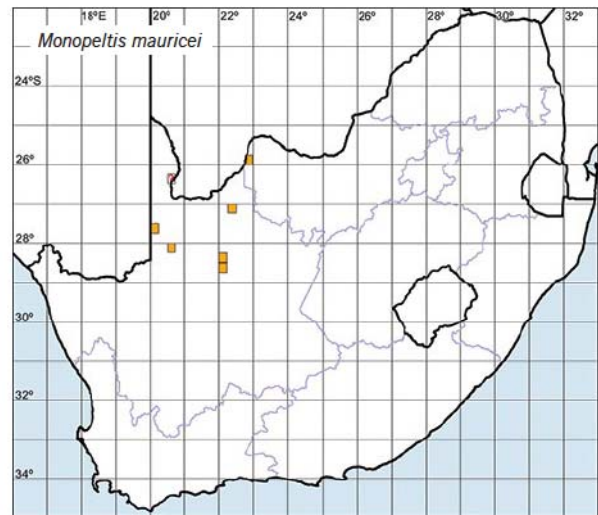
Distribution: Occurs in the Kalahari Desert, throughout much of Botswana and into adjacent Namibia and Angola in the west, Zambia and western Zimbabwe in the north (Broadley *et al.* 1976) and into the Northern Cape (north of the Orange River) and North-West provinces of South Africa (Bates *et al.* 2010). A specimen from Kgalagadi Transfrontier Park in the Northern Cape was tentatively referred to *M. sphenorhynchus* by Bates *et al.* (2010), but its status is uncertain and it is plotted here as a question mark.

Habitat: A fossorial species that digs deep burrows in sparsely-vegetated Kalahari sands.

Bioregion: Eastern Kalahari Bushveld; Kalahari Duneveld; Bushmanland.

Assessment rationale: Widespread in habitats that remain largely intact and not degraded by either human settlement or agriculture.

Conservation measures: None recommended.



Monopeltis mauricei—Tswalu Kalahari Reserve, near Kuruman, NC

G. van Dyk

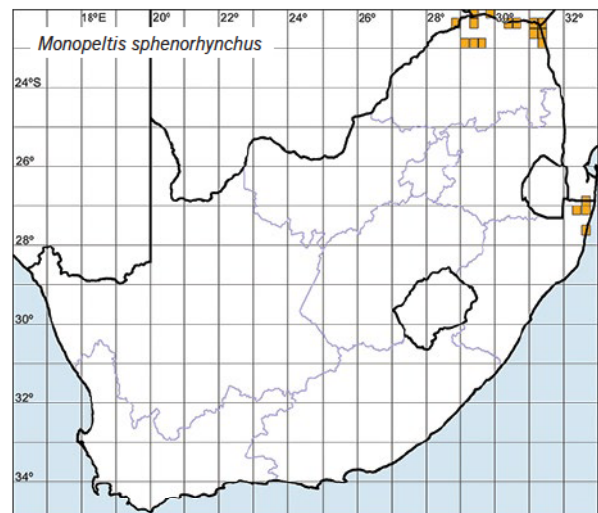
Monopeltis sphenorhynchus* Peters, 1879*SLENDER WORM LIZARD;
SLENDER SPADE-SNOURED WORM LIZARD**

G. John Measey

Regional: Least Concern

Taxonomy: *Monopeltis mauricei* was previously considered to be a subspecies of *M. sphenorhynchus* (Broadley *et al.* 1976) but was raised to specific status by Broadley (2001a). A specimen from Kgalagadi Transfrontier Park in the Northern Cape was tentatively referred to *M. sphenorhynchus* by Bates *et al.* (2010) but its identification is uncertain.

Distribution: Endemic to southern Africa. Two disjunct populations are known, one in northern KwaZulu-Natal and coastal southern Mozambique, and another in Limpopo (Branch



Monopeltis sphenorhynchus—Venetia Limpopo NR, LIMP

M. Burger

1998) and southeastern Botswana (Broadley 2001a). These may be contiguous through the poorly-surveyed regions of southern Mozambique. The species may also occur in southern Zimbabwe.

Habitat: Fossorial. Usually found in deep sand from near sea level to at least 800 m (Jacobsen 1989).

Bioregion: Mopane; Lowveld; Indian Ocean Coastal Belt.

Assessment rationale: Widespread and common.

Conservation measures: Gain a better understanding of the distribution of this species; this will benefit future assessments.

Genus *Zygaspis* Cope, 1885—purple round-headed worm lizards

Zygaspis is a small genus of seven species distributed in central and southern Africa (Broadley & Broadley 1997). Two species occur in the northern and northeastern parts of the *Atlas* region, but neither is of immediate conservation concern. The two subspecies of *Z. vandami* were evaluated together as a single entity, but if *Z. v. arenicola* proves to be a valid species, the status of the two taxa

should be re-assessed because their ranges are relatively restricted. These small amphisbaenians live in sandy soils where they feed on termites and other invertebrate prey and lay small clutches of elongate eggs (Webb *et al.* 2000a). Threats are poorly understood, but may include soil compaction and reduction in leaf litter (Measey *et al.* 2009).

Zygaspis quadrifrons (Peters, 1862)

**KALAHARI DWARF WORM LIZARD;
KALAHARI ROUND-HEADED WORM LIZARD**

G. John Measey

Regional: Least Concern

Taxonomy: No notable issues.

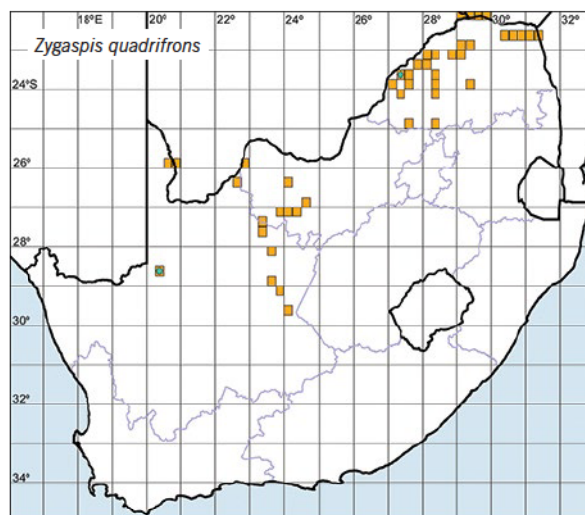
Distribution: This is the most widely distributed species of *Zygaspis*, occurring from northern South Africa through Namibia, Botswana, southern Angola, Zimbabwe, Zambia, southern Democratic Republic of the Congo, southern Malawi and Mozambique (Saiff 1970; Broadley & Broadley 1997). It is on the periphery of its range in the *Atlas* region where it occurs in Limpopo, the western parts of North-West Province, and the northern half of Northern Cape.

Habitat: In Limpopo it is found in deep Kalahari sands and in loamy as well as clayey soil; usually under stones or rotting logs, on or slightly below the soil surface, at altitudes of 250–1 200 m (Jacobsen 1989). Populations in Limpopo are found mainly in Mopane (*Colophospermum mopane*) woodland and bushveld on a granite substrate, extending into Waterberg sandstone; populations in North-West Province and the Northern Cape are found in Kalahari sands (Broadley & Broadley 1997). Individuals from the Northern Cape were found basking under neighbouring stones to those with *Monopeltis capensis* (Conradie *et al.* 2011).

Biome: Savanna; Nama-Karoo (marginal).

Assessment rationale: Widespread.

Conservation measures: None recommended.



Zygaspis quadrifrons—Caprivi, Namibia

W.R. Branch

Zygaspis vandami* (FitzSimons, 1930)*VAN DAM'S DWARF WORM LIZARD**

G. John Measey

Global: Least Concern

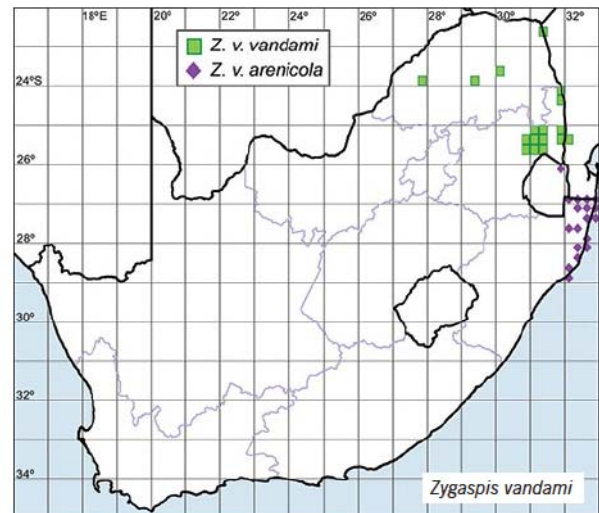
Taxonomy: Broadley & Broadley (1997) recognised two subspecies, namely *Zygaspis vandami vandami* and *Z. v. arenicola*, differing only with regard to the number of postoculars and the fusion of temporal head shields. Gans (2005) recognised these as separate species, although no taxonomic reasons were given. The taxonomic status of these taxa should be clarified, preferably through a combination of morphological and genetic techniques. Here they are treated together because their ranges appear to be contiguous.

Distribution: Endemic to southern Africa. *Zygaspis v. vandami* is probably endemic to South Africa but may also occur in adjacent parts of Mozambique and Swaziland. It has been recorded from Limpopo and northeastern Mpumalanga (Jacobsen 1989, as *Z. violacea*; Broadley & Broadley 1997). *Zygaspis v. arenicola* occurs in northeastern KwaZulu-Natal, northeastern Swaziland, southern Mozambique and southeastern Zimbabwe (Broadley & Broadley 1997; Litschka *et al.* 2008; Bates & Maguire 2009). Of particular interest are the isolated records in central and western Limpopo, which deserve closer attention. The most westerly locality (2327DD) is represented by a VM record and requires confirmation as it lies within the range of *Z. quadrifrons* (see Broadley & Broadley 1997).

Habitat: Fossorial. The two subspecies are found in different substrates and this may account for their morphological variation. *Zygaspis v. vandami* is found in shallow soils of minimum development, whereas *Z. v. arenicola* is found mostly in coastal sandy soils. They inhabit areas where leaf litter is densely aggregated, with commensurate high macro-invertebrate density (Measey *et al.* 2009). *Zygaspis v. vandami* is found under stones or logs on sandy or loamy humus-rich soils along the eastern escarpment (Jacobsen 1989; Broadley & Broadley 1997). This substrate is mostly granite, but rhyolite occurs in the Lebombo Range along the border with Mozambique. *Zygaspis v. arenicola* occurs in alluvial sands on the Mozambique plain (Broadley & Broadley 1997).

Bioregion: Lowveld; Indian Ocean Coastal Belt; Central Bushveld.

Assessment rationale: Despite a continuing decline in area, extent and quality of habitat, and a restricted number of locations (<10), this species has a large geographical range and is thus not regarded as threatened. However,



if *Z. v. arenicola* is found to be a valid species, then the two taxa will need to be re-assessed and both may qualify as Near Threatened or Vulnerable. *Zygaspis v. arenicola* would be at risk because of its small EOO and the ongoing change in human land use and management in the areas where it occurs (Measey *et al.* 2009).

Conservation measures: Little is known of normal population sizes and densities for this or any other amphisbaenian species. Such studies are urgently required, especially in KwaZulu-Natal and Mpumalanga, where much land is under management for game or is being transformed for agriculture and forestry. A PHVA would be useful in this respect.

*Zygaspis vandami vandami*—Nelspruit, MPM

D. Pietersen

*Zygaspis vandami vandami*—Farm De Hoop, SE of Nelspruit, MPM (TM 59091)

W.R. Schmidt

*Zygaspis vandami arenicola*—Kosi Bay, KZN

J. Marais